

Science, Technology, Engineering, and Mathematics Talent Expansion Program (STEP)

PROGRAM SOLICITATION

NSF 11-550

REPLACES DOCUMENT(S):

NSF 08-569



National Science Foundation

Directorate for Education & Human Resources
Division of Undergraduate Education

Full Proposal Deadline(s) (due by 5 p.m. proposer's local time):

September 27, 2011

September 25, 2012

September 26, 2013

IMPORTANT INFORMATION AND REVISION NOTES

A revised version of the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG), [NSF 11-1](#), was issued on October 1, 2010 and is effective for proposals submitted, or due, on or after January 18, 2011. Please be advised that the guidelines contained in [NSF 11-1](#) apply to proposals submitted in response to this funding opportunity.

Cost Sharing: The PAPPG has been revised to implement the National Science Board's recommendations regarding cost sharing. Inclusion of voluntary committed cost sharing is prohibited. In order to assess the scope of the project, all organizational resources necessary for the project must be described in the Facilities, Equipment and Other Resources section of the proposal. The description should be narrative in nature and must not include any quantifiable financial information. Mandatory cost sharing will only be required when explicitly authorized by the NSF Director. See the PAPP Guide Part I: *Grant Proposal Guide (GPG)* [Chapter II.C.2.g\(xi\)](#) for further information about the implementation of these recommendations.

Data Management Plan: The PAPPG contains a clarification of NSF's long standing data policy. All proposals must describe plans for data management and sharing of the products of research, or assert the absence of the need for such plans. FastLane will not permit submission of a proposal that is missing a Data Management Plan. The Data Management Plan will be reviewed as part of the intellectual merit or broader impacts of the proposal, or both, as appropriate. Links to data management requirements and plans relevant to specific Directorates, Offices, Divisions, Programs, or other NSF units are available on the NSF website at: <http://www.nsf.gov/bfa/dias/policy/dmp.jsp>. See [Chapter II.C.2.j](#) of the GPG for further information about the implementation of this requirement.

Postdoctoral Researcher Mentoring Plan: As a reminder, each proposal that requests funding to support postdoctoral researchers must include, as a supplementary document, a description of the mentoring activities that will be provided for such individuals. Please be advised that if required, FastLane will not permit submission of a proposal that is missing a Postdoctoral Researcher Mentoring Plan. See [Chapter II.C.2.j](#) of the GPG for further information about the implementation of this requirement.

REVISION SUMMARY

Deadlines for Full Proposals are provided for 2011, 2012, and 2013.

Letters of Intent are no longer requested.

Type 1C proposals are no longer requested.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Science, Technology, Engineering, and Mathematics Talent Expansion Program (STEP)

Synopsis of Program:

The Science, Technology, Engineering, and Mathematics Talent Expansion Program (STEP) seeks to increase the number of students (U.S. citizens or permanent residents) receiving associate or baccalaureate degrees in established or emerging fields within science, technology, engineering, and mathematics (STEM). Type 1 proposals are solicited that provide for full implementation efforts at academic institutions. Type 2 proposals are solicited that support educational research projects on associate or baccalaureate degree attainment in STEM.

Cognizant Program Officer(s):

Please note that the following information is current at the time of publishing. See program website for any updates to the points of contact.

- Susan H. Hixson, Lead Program Director, STEP, Division of Undergraduate Education, 835 N, telephone: (703) 292-4623, email: shixson@nsf.gov
- Maura Borrego, 840 N, telephone: (703) 292-7855, email: mborrego@nsf.gov
- Jose Herrera, 835 N, telephone: (703) 292-8670, email: jherrera@nsf.gov
- Myles G. Boylan, Program Director, 835 N, telephone: (703) 292-4617, email: mboylan@nsf.gov
- Connie K. Della-Piana, Program Director, Division of Undergraduate Education, 835 N, telephone: (703) 292-5309, email: cdellapi@nsf.gov
- Joyce B. Evans, 835 N, telephone: (703) 292-5098, email: jevans@nsf.gov
- Lee L. Zia, Program Director, 835 N, telephone: (703) 292-5140, email: lzia@nsf.gov
- Pamela Brown, 835 N, telephone: (703) 292-8670, email: pbrown@nsf.gov
- Ron Buckmire, 835 N, telephone: (703) 292-8670, email: rbuckmir@nsf.gov
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- Peter Lea, 835 N, telephone: (703) 292-8670, email: plea@nsf.gov
- Suzanne Westbrook, 835 N, telephone: (703) 292-8670, email: swestbro@nsf.gov

Applicable Catalog of Federal Domestic Assistance (CFDA) Number(s):

- 47.076 --- Education and Human Resources

Award Information

Anticipated Type of Award: Standard Grant or Continuing Grant

Estimated Number of Awards: 15 to 20 Type 1 awards and 1-3 Type 2 awards per year

Anticipated Funding Amount: \$30,000,000 per year in FY 2012, FY 2013, and FY 2014 for new and continuing awards, subject to availability of funds.

Eligibility Information

Organization Limit:

Proposals may only be submitted by the following:

- Type 1 proposals are invited from academic institutions accredited in, and having a campus located in the United States and its territories, from consortia thereof, or from nonprofit organizations that have established consortia among such academic institutions. The academic institutions must offer either associate degrees or baccalaureate degrees in science, technology, engineering and/or mathematics (STEM). Associate degree-granting institutions with a demonstrated record of articulation to STEM baccalaureate programs need not necessarily grant associate degrees in STEM fields in order to be eligible for this program.

Projects may involve a single institution, collaboration with business and industry partners, or collaboration among several institutions. For example, projects may include collaborative efforts that improve the transition of students among the collaborating institutions, such as transfer between two- and four-year institutions.

Type 2 proposals are invited from any individual or organization eligible to submit proposals to the NSF.

PI Limit:

None Specified

Limit on Number of Proposals per Organization:

An institution that awards baccalaureate degrees is allowed to submit only one Type 1 proposal, or to be part of only one consortium submitting a Type 1 proposal. An institution that awards associate degrees, and does not award baccalaureate degrees, is allowed to be the lead institution on only one Type 1 proposal, and, in addition, may be a partner on one or more Type 1 proposals. There are no restrictions on the number of Type 2 proposals that an individual or organization may submit.

Limit on Number of Proposals per PI:

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Not Applicable
- **Preliminary Proposal Submission:** Not Applicable
- **Full Proposals:**
 - Full Proposals submitted via FastLane: NSF Proposal and Award Policies and Procedures Guide, Part I: Grant Proposal Guide (GPG) Guidelines apply. The complete text of the GPG is available electronically on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg.
 - Full Proposals submitted via Grants.gov: NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov Guidelines apply (Note: The NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide)

B. Budgetary Information

- **Cost Sharing Requirements:** Inclusion of voluntary committed cost sharing is prohibited.
- **Indirect Cost (F&A) Limitations:** Not Applicable
- **Other Budgetary Limitations:** Other budgetary limitations apply. Please see the full text of this solicitation for further information.

C. Due Dates

- **Full Proposal Deadline(s)** (due by 5 p.m. proposer's local time):
 - September 27, 2011
 - September 25, 2012
 - September 26, 2013

Proposal Review Information Criteria

Merit Review Criteria: National Science Board approved criteria. Additional merit review considerations apply. Please see the full text of this solicitation for further information.

Award Administration Information

Award Conditions: Standard NSF award conditions apply.

Reporting Requirements: Additional reporting requirements apply. Please see the full text of this solicitation for further information.

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I. INTRODUCTION

Undergraduate education is central to the National Science Foundation's mission in human resource development. Whether preparing students to participate as citizens in a technological society, to enter the workforce with two- or four-year degrees, to continue their formal education in graduate school, or to further their education in response to new career goals or workplace expectations, undergraduate education provides the critical link between the Nation's secondary schools and a society increasingly dependent upon science and technology. Increasing the number of undergraduate students obtaining degrees in science, technology, engineering, and mathematics (STEM) fields will provide a workforce that is prepared to ensure a healthy economy, respond to demands for national security, and maintain and elevate the quality of life and standard of living in the United States through technological and scientific advancements. The essential role of science and technology in the economy was highlighted in a recent report from the National Academies of Science, *Rising Above the Gathering Storm, Revisited: Rapidly Approaching Category 5* (National Academies Press, 2010). The report noted that "Substantial evidence continues to indicate that over the long term the great majority of newly created jobs are the indirect or direct result of advancements in science and technology, thus making these and related disciplines assume what might be described as disproportionate importance."

II. PROGRAM DESCRIPTION

All Type 1 Proposals

Program activities under the STEP Type 1 competition should be efforts aimed at adapting and implementing best practices that will lead to an increase in the number of students (United States citizens or permanent residents) obtaining STEM degrees at institutions with baccalaureate degree programs or completing associate degrees in STEM fields or completing credits toward transfer to a baccalaureate degree program in STEM fields at community colleges. The goal of the project must be to increase the total graduation numbers of such students at the institution(s), and all STEP proposals must include specific numerical targets for these increases. If a project focuses efforts on only a subset of STEM fields, increases in those fields must not be at the expense of degrees granted in other STEM fields. Projects may focus on the retention and/or recruitment of undergraduate students into STEM fields. Outreach efforts are appropriate only if the efforts can be expected to result in additional STEM majors and graduates at the submitting institution(s) within the grant period.

All Type 1 projects are considered to be institutional efforts. A Type 1 proposal should be identified as falling into one of two categories: 1A or 1B.

A **Type 1A** proposal is submitted by an institution that has not previously been the lead institution on a STEP Type 1 award.

A **Type 1B** proposals submitted by an institution that has previously been the lead institution on a STEP Type 1 award. The proposal is for a new five-year implementation project that is not intended to simply continue efforts for which funding was provided under the original award or to support a project that represents a small adjustment in activities or a simple change in the targeted population. It is intended to fund efforts that are substantially different from those supported in the original award. A Type 1B proposal must provide information about the previous Type 1 grant, including (1) evaluation information that supports claims of successes that have been achieved, (2) the degree to which the previous project has been institutionalized, (3) a description of significantly new directions in which the project will be heading, (4) the rationale for choosing these new directions, and (5) the relationship between the previous project and the proposed project. At least four years of data about the effects of the previous STEP Type 1 grant on student enrollments and graduation rates in STEM must be provided.

As examples, Type 1A or 1B projects might propose a comprehensive effort that uses some combination of the following approaches in order to increase the number of graduates in STEM fields:

- Programs that intend to increase the number of students persisting in STEM courses and majors by focusing directly on the quality of student learning, including efforts that encourage (a) high-caliber teaching, including enabling faculty to spend additional time teaching participating students in smaller class settings, including in the laboratory environment; (b) opportunities to implement new pedagogical approaches such as the implementation of active learning strategies, web-based course strategies, distributed and collaborative digital teaching tools, or interactive course modules; and (c) training of teaching assistants;
- Programs that expand the capacity of institutions of higher education to incorporate current advances in science, technology, engineering, and mathematics (STEM) into the undergraduate learning environment;
- Programs including interdisciplinary approaches to undergraduate STEM education;
- Bridge programs that enable students at community colleges to matriculate directly into baccalaureate STEM programs;
- Programs among collaborating academic institutions designed to increase the number of pathways available for achieving a degree in STEM, or to improve the articulation among programs at the institutions;
- Mentoring programs that involve faculty or peer student mentoring;
- Programs that focus on increasing enrollments in STEM undergraduate majors through the incorporation of strategies targeted at traditionally underrepresented students (low-income, ethnic and racial minority students, first-generation college students, women, and persons with disabilities);
- Programs that (a) facilitate student exposure to potential careers, including cooperative programs with industry or government that place students in internships as early as the summer following their first year of study; (b) provide part-time employment in industry during the school year; or (c) provide opportunities for undergraduates to participate in industry- or

government-sponsored research;

- Programs to encourage undergraduate research, particularly in the early undergraduate years, on- or off-campus;
- Programs that assist institutions of higher education in states that participate in the Experimental Program to Stimulate Competitive Research (EPSCoR) to broaden the STEM student base or increase retention in these fields;
- Programs that recruit and retain Veterans in STEM fields;
- Programs that provide financial incentives to students entering and persisting in the study of STEM; or
- Other approaches to achieving program goals.

The intent of a STEP project should be to make a significant impact on the culture at an institution(s) with the expectation that major portions of the impact will be sustained after the completion of the project. The most competitive proposals are those based on an institutional self-study that has determined when and why students leave STEM majors at the institution or identifies untapped recruitment opportunities and that focuses on changing the situation through appropriate strategies. A project that supports only a targeted cohort of students without including strategies for on-going institutional change is not likely to be competitive. Finally, although the use of scholarships is allowed as one part of a larger strategic effort to retain students, if the project is intended to rely largely on scholarships, it should be submitted to the [NSF Scholarships in Science, Technology, Engineering, and Mathematics \(S-STEM\) Program](#).

For projects that are considering outreach to high school students, such activities are appropriate only if they will recruit students to the proposing institution(s) and if the high school students will be entering and progressing through undergraduate STEM majors within the five-year period of the proposed project. In most cases, this requires that outreach and recruitment efforts be limited to juniors and seniors in high schools that have a history of sending their graduates to the proposing institution(s).

Outcomes

The outcomes expected of funded Type 1A and Type 1B STEP projects include all of the following:

- Significant progress toward achieving the specific proposed increases in the number of students who are United States citizens or permanent residents obtaining STEM degrees at institutions with baccalaureate degree programs or completing associate degrees or completing credits in STEM fields at a community college toward transfer to a baccalaureate degree;
- A description of the activities that have been institutionalized as a result of the project;
- A description of the expectations, following the end of the grant period, for continued efforts at the institution to increase the number of STEM degrees in established or emerging fields at institutions with baccalaureate degree programs or completing associate degrees in established or emerging fields or completing credits in STEM fields at a community college toward transfer to a baccalaureate degree;
- An evaluation, using the preliminary indicators and benchmarks defined in the proposal, that informs the institution and others about the effectiveness of specific implementation strategies; and
- Effective dissemination of project processes and results to the broader community.

All Type 1A and Type 1B grants will be reviewed during their third year to determine whether satisfactory progress has been made, with continued funding contingent on the result of the third-year review.

In addition to the individual project evaluation, Principal Investigators of all Type 1 awards will be required to participate in evaluation activities related to the Directorate for Education and Human Resource's program monitoring and program evaluation.

Type 2

Program activities under the STEP Type 2 competition represent educational research on factors affecting associate or baccalaureate degree attainment in STEM. The results are expected to contribute to the knowledge base of scholarly research in education. Proposals requesting up to a total of \$1.5 million for projects of up to a duration of four years should be based in a research design that incorporates appropriate and proven methodologies and strategies. The proposal should identify the research questions, and the results should provide convincing evidence of the relationship of the factor(s) (including departmental/institutional) studied to the issues of associate and/or baccalaureate degree attainment, and/or undergraduate access to STEM careers, and/or persistence to STEM graduate study. These educational research studies should reflect explicit cognizance of the broad variety of institutions of higher education, and should address the unique challenges and opportunities posed by that variety. Studies that involve a single institution are discouraged unless the proposal provides compelling arguments that the results can be generalized to the larger community. The proposed research should be developed with the intent to provide the education community, including faculty, administrators, policymakers, and parents, with practical information to consider with respect to the impact of the factor(s) being studied within the educational system. The results should enable the education community to guide better the future development of learning experiences, and to foster the retention and academic success of diverse students in STEM. Faculty in STEM disciplines are strongly encouraged to collaborate with appropriate experts in educational research when developing a Type 2 proposal.

Note that broader research opportunities in student learning and student academic success are eligible for support under the [Research and Evaluation on Education in Science and Engineering \(REESE\) Program](#).

Outcomes

The outcomes expected of funded Type 2 STEP projects include all of the following:

- Evidence concerning an important factor(s) and its role(s) in associate and/or baccalaureate degree attainment, and/or undergraduate access to STEM careers, and/or persistence to STEM graduate study;
- Practical information useful to educators about the impact of the factor(s) that has been studied within the educational system; and
- Dissemination of the research results to the education community.

III. AWARD INFORMATION

The number and size of awards will depend on the quality of the proposals received and the availability of funds.

Type 1

Grant duration for Type 1A and 1B awards is expected to be 5 years, with the final 2 years of funding contingent on determination that satisfactory progress has been made by the awardee during the first 3 years. The level of funding for which institutions can apply is based on their total enrollments of undergraduate students (full-time equivalents). Institutions enrolling 5,000 or fewer undergraduate students may request up to a total of \$500,000 for a period of five years, those enrolling between 5,000 and 15,000 undergraduate students may request up to a total of \$1.0 million for five years, and those enrolling more than 15,000 undergraduate students may request up to a total of \$2.0 million for five years. Consortia of institutions are eligible to request funds within these limits based on their total, combined undergraduate enrollment. Such consortial requests must provide clear evidence that the proposed partnership is both meaningful and important to the success of the project. In addition, consortia for which the lead institution is one that awards baccalaureate degrees may request additional funds if the consortium includes one or more institutions that award only associate degrees, and if the institution(s) that awards associate degrees has a substantive role in the project and will receive significant funding under the request. In such cases the total that may be requested is raised from \$500,000 to \$600,000, or from \$1.0 million to \$1.2 million, or from \$2.0 million to \$2.5 million according to the guidelines above based on the total, combined enrollments of undergraduate students (full-time equivalents).

Awards will be made as standard or continuing grants. The expectation is that about 15 to 20 Type 1 awards will be made each year.

Type 2

Grant duration for Type 2 awards is 1 to 4 years, and the request may be up to a total of \$1.5 million. Type 2 proposals are exempt from the restriction on Type 1 proposals limiting an institution to participation in only one submission. The expectation is that 1 to 3 Type 2 awards will be made each year.

IV. ELIGIBILITY INFORMATION

Organization Limit:

Proposals may only be submitted by the following:

- Type 1 proposals are invited from academic institutions accredited in, and having a campus located in the United States and its territories, from consortia thereof, or from nonprofit organizations that have established consortia among such academic institutions. The academic institutions must offer either associate degrees or baccalaureate degrees in science, technology, engineering and/or mathematics (STEM). Associate degree-granting institutions with a demonstrated record of articulation to STEM baccalaureate programs need not necessarily grant associate degrees in STEM fields in order to be eligible for this program.

Projects may involve a single institution, collaboration with business and industry partners, or collaboration among several institutions. For example, projects may include collaborative efforts that improve the transition of students among the collaborating institutions, such as transfer between two- and four-year institutions.

Type 2 proposals are invited from any individual or organization eligible to submit proposals to the NSF.

PI Limit:

None Specified

Limit on Number of Proposals per Organization:

An institution that awards baccalaureate degrees is allowed to submit only one Type 1 proposal, or to be part of only one consortium submitting a Type 1 proposal. An institution that awards associate degrees, and does not award baccalaureate degrees, is allowed to be the lead institution on only one Type 1 proposal, and, in addition, may be a partner on one or more Type 1 proposals. There are no restrictions on the number of Type 2 proposals that an individual or organization may submit.

Limit on Number of Proposals per PI:

See Limit on Number of Proposals per Organization

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Full Proposal Preparation Instructions: Proposers may opt to submit proposals in response to this Program Solicitation via Grants.gov or via the NSF FastLane system.

- Full proposals submitted via FastLane: Proposals submitted in response to this program solicitation should be prepared and

submitted in accordance with the general guidelines contained in the NSF Grant Proposal Guide (GPG). The complete text of the GPG is available electronically on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg. Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov. Proposers are reminded to identify this program solicitation number in the program solicitation block on the NSF Cover Sheet For Proposal to the National Science Foundation. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

- Full proposals submitted via Grants.gov: Proposals submitted in response to this program solicitation via Grants.gov should be prepared and submitted in accordance with the NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov. The complete text of the NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: (http://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide). To obtain copies of the Application Guide and Application Forms Package, click on the Apply tab on the Grants.gov site, then click on the Apply Step 1: Download a Grant Application Package and Application Instructions link and enter the funding opportunity number, (the program solicitation number without the NSF prefix) and press the Download Package button. Paper copies of the Grants.gov Application Guide also may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov.

In determining which method to utilize in the electronic preparation and submission of the proposal, please note the following:

Collaborative Proposals. All collaborative proposals submitted as separate submissions from multiple organizations must be submitted via the NSF FastLane system. Chapter II, Section D.4 of the Grant Proposal Guide provides additional information on collaborative proposals.

The following instructions supplement the GPG guidelines:

Cover Sheet

- For Type 1 proposals, the signature of the Authorized Organizational Representative (AOR) on the Cover Sheet signifies that the proposer and all partner organizations understand and agree to the following statement: The AOR of each organization involved in this proposal is aware of this submission.

Project Description

In addition to describing the proposed activities, all Type 1A and 1B proposals are expected to include within the 15 pages of the Project Description:

- The current undergraduate STEM enrollment and graduation figures at the institution(s), and the total undergraduate student enrollment (FTE) at the institution(s);
- A clearly stated summary of both the numerical and percentage increases expected during the grant period in the number of students who are United States citizens or permanent residents obtaining STEM degrees at institutions with baccalaureate degree programs or completing associate degrees or completing credits in STEM fields at community colleges toward transfer to a baccalaureate degree program;
- The reasons that working toward an increase in the number of students graduating in STEM areas is compatible with the institution's mission;
- A description of prior efforts to increase interest in STEM and results of those efforts;
- A statement of the overall vision that underlies the institution's management and implementation plan to increase the numbers of students graduating in STEM areas;
- The specific strategies to be used during the grant period to increase the number of students graduating in STEM fields, with rationales and justifications for these efforts;
- An explanation of why the proposed activities are not expected to cause decreases in the enrollments in other STEM fields, should the project activities focus on only a subset of STEM fields;
- A clear statement of which of the proposed activities, if successful, would be expected to be institutionalized by the end of the grant period and of which of the proposed activities, if successful, would require further sources of support in order to be continued; and
- The preliminary indicators and benchmarks that will be used to determine which implementation strategies are proving to be effective; the evaluation plan should include methods that will help the project to determine how implementations might be improved, and to determine early on whether specific strategies are likely to be effective.

In addition to the information that must be included in all Type 1 proposals, a Type 1B proposal must provide:

- Information about the previous Type 1 grant including evaluation information that supports claims of successes that have been achieved and the degree to which the previous project has been institutionalized;
- A description of significantly new directions in which the project will be heading, the rationale for choosing these new directions, and the relationship between the previous project and the proposed project; and
- An analysis of at least four years of data about the effects of the previous STEP Type 1 grant on student enrollments and graduation rates in STEM.

The National Science Foundation allows maximum flexibility in the design of efforts to increase the number of students receiving associate or baccalaureate degrees in established or emerging fields within STEM fields. However, the Type 1 proposal must fully document the rationales for choosing the efforts to be undertaken, including relevant results from efforts that have been undertaken at other institutions in the past. The emphasis in the proposal should be on the adaptation and implementation of best practices. The relevant research or knowledge base that supports the effectiveness of the efforts should be included, when appropriate. If innovative strategies are proposed, the proposal should include compelling arguments for why these strategies are expected to result in an increase in the number of students earning associate or baccalaureate degrees in STEM. Funded Type 1 projects will be expected to establish an Internal Advisory Committee, chaired by the Chief Academic Officer (or other appropriate administrative official should the Chief Academic Officer be a PI or co-PI on the project) at the institution, with members drawn from disciplines across the STEM fields. The members of this Internal Advisory Committee should be specified in the proposal. This committee is expected to meet with project personnel at least once every six months throughout the grant period in order to provide advice to the project, and to facilitate dissemination about the project throughout the institution(s). In addition, funded Type 1 and Type 2 proposals will be expected to establish an External Advisory Committee of three to four members from outside the project institution(s). This committee is expected to meet with project personnel within three months of the start of the project and then at yearly intervals in order to provide advice to the project. The members of the External Advisory Committee need not be specified in the proposal but can be named at the time that a project is recommended for funding.

Additional Instructions

A Project Data Form must be submitted as part of all Type 1 and Type 2 proposals. The information on this form is used to direct proposals to appropriate reviewers and to determine the characteristics of projects supported by the Division of Undergraduate

Education (DUE). In FastLane, this form will appear in the list of forms for your proposal only after you have (1) selected the "STEP" program announcement/solicitation number on the Cover Sheet and (2) saved the Cover Sheet.

Special Information and Supplementary Documentation

Letters of Support are allowed in the Special Information and Supplementary Documentation Section. Other documents are allowed in this section only as specified in the [NSF Grant Proposal Guide](#).

B. Budgetary Information

Cost Sharing: Inclusion of voluntary committed cost sharing is prohibited

Other Budgetary Limitations:

Grant duration is expected to be 5 years for Type 1A and 1B proposals and 1-4 years for Type 2 proposals.

Grant duration for Type 1A and 1B awards is expected to be 5 years, with the final 2 years of funding contingent on determination that satisfactory progress has been made by the awardee during the first 3 years. The level of funding for which institutions can apply is based on their total enrollments of undergraduate students (full-time equivalents). Institutions enrolling 5,000 or fewer undergraduate students may request up to a total of \$500,000 for a period of five years, those enrolling between 5000 and 15,000 undergraduate students may request up to a total of \$1.0 million for five years, and those enrolling more than 15,000 undergraduate students may request up to a total of \$2.0 million for five years. Consortia of institutions are eligible to request funds within these limits based on their total, combined undergraduate enrollment. Such consortial requests must provide clear evidence that the proposed partnership is both meaningful and important to the success of the project. In addition, consortia for which the lead institution is one that awards baccalaureate degrees may request additional funds if the consortium includes one or more institutions that award only associate degrees, and if the institution(s) that awards associate degrees has a leadership role in the project and will receive significant funding under the request. In such cases the total that may be requested is raised from \$500,000 to \$600,000, or from \$1.0 million to \$1.2 million, or from \$2.0 million to \$2.5 million according to the guidelines above based on the total enrollments of undergraduate students (full-time equivalents). For Type 2 proposals, individuals or organizations are eligible to request up to a total of \$1.5 million.

For both Type 1 and Type 2 proposals, the budget should include provisions for the Principal Investigators and several additional project personnel to attend an annual meeting of STEP Principal Investigators in the Washington, DC area.

C. Due Dates

- **Full Proposal Deadline(s)** (due by 5 p.m. proposer's local time):

September 27, 2011

September 25, 2012

September 26, 2013

D. FastLane/Grants.gov Requirements

- **For Proposals Submitted Via FastLane:**

Detailed technical instructions regarding the technical aspects of preparation and submission via FastLane are available at: <https://www.fastlane.nsf.gov/a1/newstan.htm>. For FastLane user support, call the FastLane Help Desk at 1-800-673-6188 or e-mail fastlane@nsf.gov. The FastLane Help Desk answers general technical questions related to the use of the FastLane system. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this funding opportunity.

Submission of Electronically Signed Cover Sheets. The Authorized Organizational Representative (AOR) must electronically sign the proposal Cover Sheet to submit the required proposal certifications (see Chapter II, Section C of the Grant Proposal Guide for a listing of the certifications). The AOR must provide the required electronic certifications within five working days following the electronic submission of the proposal. Further instructions regarding this process are available on the FastLane Website at: <https://www.fastlane.nsf.gov/fastlane.jsp>.

- **For Proposals Submitted Via Grants.gov:**

Before using Grants.gov for the first time, each organization must register to create an institutional profile. Once registered, the applicant's organization can then apply for any federal grant on the Grants.gov website. Comprehensive information about using Grants.gov is available on the Grants.gov Applicant Resources webpage: http://www07.grants.gov/applicants/app_help_reso.jsp. In addition, the NSF Grants.gov Application Guide provides additional technical guidance regarding preparation of proposals via Grants.gov. For Grants.gov user support, contact the Grants.gov Contact Center at 1-800-518-4726 or by email: support@grants.gov. The Grants.gov Contact Center answers general technical questions related to the use of Grants.gov. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this solicitation.

Submitting the Proposal: Once all documents have been completed, the Authorized Organizational Representative (AOR) must submit the application to Grants.gov and verify the desired funding opportunity and agency to which the application is submitted. The AOR must then sign and submit the application to Grants.gov. The completed application will be transferred to the NSF FastLane system for further processing.

VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

Proposals received by NSF are assigned to the appropriate NSF program where they will be reviewed if they meet NSF proposal preparation requirements. All proposals are carefully reviewed by a scientist, engineer, or educator serving as an NSF Program Officer, and usually by three to ten other persons outside NSF who are experts in the particular fields represented by the proposal. These reviewers are selected by Program Officers charged with the oversight of the review process. Proposers are invited to suggest names of persons they believe are especially well qualified to review the proposal and/or persons they would prefer not review the proposal. These suggestions may serve as one source in the reviewer selection process at the Program Officer's discretion. Submission of such names, however, is optional. Care is taken to ensure that reviewers have no conflicts of interest with the proposal.

A. NSF Merit Review Criteria

All NSF proposals are evaluated through use of the two National Science Board (NSB)-approved merit review criteria: intellectual merit and the broader impacts of the proposed effort. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

The two NSB-approved merit review criteria are listed below. The criteria include considerations that help define them. These considerations are suggestions and not all will apply to any given proposal. While proposers must address both merit review criteria, reviewers will be asked to address only those considerations that are relevant to the proposal being considered and for which the reviewer is qualified to make judgements.

What is the intellectual merit of the proposed activity?

How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields? How well qualified is the proposer (individual or team) to conduct the project? (If appropriate, the reviewer will comment on the quality of the prior work.) To what extent does the proposed activity suggest and explore creative, original, or potentially transformative concepts? How well conceived and organized is the proposed activity? Is there sufficient access to resources?

What are the broader impacts of the proposed activity?

How well does the activity advance discovery and understanding while promoting teaching, training, and learning? How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)? To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships? Will the results be disseminated broadly to enhance scientific and technological understanding? What may be the benefits of the proposed activity to society?

Examples illustrating activities likely to demonstrate broader impacts are available electronically on the NSF website at: <http://www.nsf.gov/pubs/gpg/broaderimpacts.pdf>.

Mentoring activities provided to postdoctoral researchers supported on the project, as described in a one-page supplementary document, will be evaluated under the Broader Impacts criterion.

Additional Solicitation Specific Review Criteria

In considering the above criteria for Type 1A and 1B proposals, reviewers will be asked to comment on the following:

- Does the projected increase in STEM graduates appear aligned with the mission of the institution(s) and the design of the project?
- Is a compelling overall vision provided for the plan of the institution(s) to achieve a substantial increase in STEM graduates and is the proposed effort important to the attainment of that vision?
- Is strong justification provided to indicate that the proposed efforts are likely to be successful?
- Do the management and implementation details provide appropriate support for the proposed project?
- Are the proposed efforts likely to lead to an increase in the total number of STEM graduates, as opposed to causing an increase in one or a few STEM fields while allowing for a decrease in other STEM fields?
- Does the evaluation plan include appropriate preliminary indicators, benchmarks, and methods for determining the effectiveness of the proposed implementation strategies?
- Are clear statements provided elaborating which of the proposed activities are likely to be institutionalized by the end of the grant period and which of the proposed activities would require further sources of support in order to be continued?

In addition to the questions that reviewers will be asked to comment on for all Type 1 proposals, reviewers will be asked to comment on the following for Type 1B proposals:

- To what extent has the previous STEP award at the institution been successful and what elements have been institutionalized?
- Is the relationship between the previous STEP award and the proposed project clear, and are the rationales for choosing new directions convincing?

In considering the above criteria for Type 2 proposals, reviewers will be asked to comment on the following:

- Does the proposal identify a significant factor(s) in facilitating associate and/or baccalaureate degree attainment, and/or undergraduate access to STEM careers, and/or persistence to STEM graduate study, and are the proposed efforts likely to lead to significant findings?
- Is the study likely to provide practical information useful to educators about the potential impact of the factor(s) being studied?
- How likely is the dissemination plan to inform all parts of the education community of important results from the project?

NSF staff also will give careful consideration to the following in making funding decisions:

Integration of Research and Education

One of the principal strategies in support of NSF's goals is to foster integration of research and education through the programs, projects, and activities it supports at academic and research institutions. These institutions provide abundant opportunities where individuals may concurrently assume responsibilities as researchers, educators, and students and where all can engage in joint efforts that infuse education with the excitement of discovery and enrich research through the diversity of learning perspectives.

Integrating Diversity into NSF Programs, Projects, and Activities

Broadening opportunities and enabling the participation of all citizens -- women and men, underrepresented minorities, and persons with disabilities -- is essential to the health and vitality of science and engineering. NSF is committed to this principle of diversity and deems it central to the programs, projects, and activities it considers and supports.

B. Review and Selection Process

Proposals submitted in response to this program solicitation will be reviewed by Panel Review.

Reviewers will be asked to formulate a recommendation to either support or decline each proposal. The Program Officer assigned to manage the proposal's review will consider the advice of reviewers and will formulate a recommendation.

After scientific, technical and programmatic review and consideration of appropriate factors, the NSF Program Officer recommends to the cognizant Division Director whether the proposal should be declined or recommended for award. NSF is striving to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. The time interval begins on the deadline or target date, or receipt date, whichever is later. The interval ends when the Division Director accepts the Program Officer's recommendation.

A summary rating and accompanying narrative will be completed and submitted by each reviewer. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers, are sent to the Principal Investigator/Project Director by the Program Officer. In addition, the proposer will receive an explanation of the decision to award or decline funding.

In all cases, after programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the Division of Grants and Agreements for review of business, financial, and policy implications and the processing and issuance of a grant or other agreement. Proposers are cautioned that only a Grants and Agreements Officer may make commitments, obligations or awards on behalf of NSF or authorize the expenditure of funds. No commitment on the part of NSF should be inferred from technical or budgetary discussions with a NSF Program Officer. A Principal Investigator or organization that makes financial or personnel commitments in the absence of a grant or cooperative agreement signed by the NSF Grants and Agreements Officer does so at their own risk.

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

Notification of the award is made to *the submitting organization* by a Grants Officer in the Division of Grants and Agreements. Organizations whose proposals are declined will be advised as promptly as possible by the cognizant NSF Program administering the program. Verbatim copies of reviews, not including the identity of the reviewer, will be provided automatically to the Principal Investigator. (See Section VI.B. for additional information on the review process.)

B. Award Conditions

An NSF award consists of: (1) the award letter, which includes any special provisions applicable to the award and any numbered amendments thereto; (2) the budget, which indicates the amounts, by categories of expense, on which NSF has based its support (or otherwise communicates any specific approvals or disapprovals of proposed expenditures); (3) the proposal referenced in the award letter; (4) the applicable award conditions, such as Grant General Conditions (GC-1); * or Research Terms and Conditions * and (5) any announcement or other NSF issuance that may be incorporated by reference in the award letter. Cooperative agreements also are administered in accordance with NSF Cooperative Agreement Financial and Administrative Terms and Conditions (CA-FATC) and the applicable Programmatic Terms and Conditions. NSF awards are electronically signed by an NSF Grants and Agreements Officer and transmitted electronically to the organization via e-mail.

*These documents may be accessed electronically on NSF's Website at http://www.nsf.gov/awards/managing/award_conditions.jsp?org=NSF. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov.

More comprehensive information on NSF Award Conditions and other important information on the administration of NSF awards is contained in the *NSF Award & Administration Guide* (AAG) Chapter II, available electronically on the NSF Website at http://www.nsf.gov/publications/pub_summ.jsp?ods_key=aag.

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the Principal Investigator must submit an annual project report to the cognizant Program Officer at least 90 days before the end of the current budget period. (Some programs or awards require more frequent project reports). Within 90 days after expiration of a grant, the PI also is required to submit a final project report, and a project outcomes report for the general public.

Failure to provide the required annual or final project reports, or the project outcomes report will delay NSF review and processing of any future funding increments as well as any pending proposals for that PI. PIs should examine the formats of the required reports in advance to assure availability of required data.

PIs are required to use NSF's electronic project-reporting system, available through FastLane, for preparation and submission of annual and final project reports. Such reports provide information on activities and findings, project participants (individual and

organizational), publications, and other specific products and contributions. PIs will not be required to re-enter information previously provided, either with a proposal or in earlier updates using the electronic system. Submission of the report via FastLane constitutes certification by the PI that the contents of the report are accurate and complete. The project outcomes report must be prepared and submitted using Research.gov. This report serves as a brief summary, prepared specifically for the public, of the nature and outcomes of the project. This report will be posted on the NSF website exactly as it is submitted by the PI.

Principal Investigators will be required to participate in evaluation activities related to the Directorate for Education and Human Resources' program evaluation. In addition, each academic institution involved in a funded project will be expected to provide annually, to the principal investigator of the project, data pertaining to student enrollments, student achievement, student persistence to degrees, and student placements following graduation.

VIII. AGENCY CONTACTS

Please note that the program contact information is current at the time of publishing. See program website for any updates to the points of contact.

General inquiries regarding this program should be made to:

- Susan H. Hixson, Lead Program Director, STEP, Division of Undergraduate Education, 835 N, telephone: (703) 292-4623, email: shixson@nsf.gov
- Maura Borrego, 840 N, telephone: (703) 292-7855, email: mborrego@nsf.gov
- Jose Herrera, 835 N, telephone: (703) 292-8670, email: jherrera@nsf.gov
- Myles G. Boylan, Program Director, 835 N, telephone: (703) 292-4617, email: mboylan@nsf.gov
- Connie K. Della-Piana, Program Director, Division of Undergraduate Education, 835 N, telephone: (703) 292-5309, email: cdellapi@nsf.gov
- Joyce B. Evans, 835 N, telephone: (703) 292-5098, email: jevans@nsf.gov
- Lee L. Zia, Program Director, 835 N, telephone: (703) 292-5140, email: lzia@nsf.gov
- Pamela Brown, 835 N, telephone: (703) 292-8670, email: pbrown@nsf.gov
- Ron Buckmire, 835 N, telephone: (703) 292-8670, email: rbuckmir@nsf.gov
- Suzanne C. Fitzgerald, 835 N, telephone: (703) 292-4641, email: scfztzge@nsf.gov
- Joseph Grabowski, 835 N, telephone: (703) 292-8670, email: jgrabows@nsf.gov
- Peter Lea, 835 N, telephone: (703) 292-8670, email: plea@nsf.gov
- Suzanne Westbrook, 835 N, telephone: (703) 292-8670, email: swestbro@nsf.gov

For questions related to the use of FastLane, contact:

- FastLane Help Desk, telephone: 1-800-673-6188; e-mail: fastlane@nsf.gov.

For questions relating to Grants.gov contact:

- Grants.gov Contact Center: If the Authorized Organizational Representatives (AOR) has not received a confirmation message from Grants.gov within 48 hours of submission of application, please contact via telephone: 1-800-518-4726; e-mail: support@grants.gov.

General inquiries regarding Science, Technology, Engineering, and Mathematics Talent Expansion Program should be made to: Division of Undergraduate Education, telephone: 703-292-8670, e-mail: undergrad@nsf.gov.

IX. OTHER INFORMATION

The NSF Website provides the most comprehensive source of information on NSF Directorates (including contact information), programs and funding opportunities. Use of this Website by potential proposers is strongly encouraged. In addition, National Science Foundation Update is a free e-mail subscription service designed to keep potential proposers and other interested parties apprised of new NSF funding opportunities and publications, important changes in proposal and award policies and procedures, and upcoming NSF Regional Grants Conferences. Subscribers are informed through e-mail when new publications are issued that match their identified interests. Users can subscribe to this service by clicking the "Get NSF Updates by Email" link on the [NSF web site](#).

Grants.gov provides an additional electronic capability to search for Federal government-wide grant opportunities. NSF funding opportunities may be accessed via this new mechanism. Further information on Grants.gov may be obtained at <http://www.grants.gov>.

ABOUT THE NATIONAL SCIENCE FOUNDATION

The National Science Foundation (NSF) is an independent Federal agency created by the National Science Foundation Act of 1950, as amended (42 USC 1861-75). The Act states the purpose of the NSF is "to promote the progress of science; [and] to advance the national health, prosperity, and welfare by supporting research and education in all fields of science and engineering."

NSF funds research and education in most fields of science and engineering. It does this through grants and cooperative agreements to more than 2,000 colleges, universities, K-12 school systems, businesses, informal science organizations and other research organizations throughout the US. The Foundation accounts for about one-fourth of Federal support to academic institutions for basic research.

NSF receives approximately 40,000 proposals each year for research, education and training projects, of which approximately 11,000 are funded. In addition, the Foundation receives several thousand applications for graduate and postdoctoral fellowships. The agency operates no laboratories itself but does support National Research Centers, user facilities, certain oceanographic vessels and Arctic and Antarctic research stations. The Foundation also supports cooperative research between universities and industry, US participation in international scientific and engineering efforts, and educational activities at every academic level.

Facilitation Awards for Scientists and Engineers with Disabilities provide funding for special assistance or equipment to enable persons with disabilities to work on NSF-supported projects. See Grant Proposal Guide Chapter II, Section D.2 for instructions regarding preparation of these types of proposals.

The National Science Foundation has Telephonic Device for the Deaf (TDD) and Federal Information Relay Service (FIRS) capabilities that enable individuals with hearing impairments to communicate with the Foundation about NSF programs, employment or general information. TDD may be accessed at (703) 292-5090 and (800) 281-8749, FIRS at (800) 877-8339.

The National Science Foundation Information Center may be reached at (703) 292-5111.

The National Science Foundation promotes and advances scientific progress in the United States by competitively awarding grants and cooperative agreements for research and education in the sciences, mathematics, and engineering.

To get the latest information about program deadlines, to download copies of NSF publications, and to access abstracts of awards, visit the NSF Website at <http://www.nsf.gov>

- **Location:** 4201 Wilson Blvd. Arlington, VA 22230
- **For General Information**
(NSF Information Center): (703) 292-5111
- **TDD (for the hearing-impaired):** (703) 292-5090
- **To Order Publications or Forms:**

Send an e-mail to: nsfpubs@nsf.gov

or telephone: (703) 292-7827
- **To Locate NSF Employees:** (703) 292-5111

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; and project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers and staff assistants as part of the proposal review process; to proposer institutions/grantees to provide or obtain data regarding the proposal review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers and educators as necessary to complete assigned work; to other government agencies or other entities needing information regarding applicants or nominees as part of a joint application review process, or in order to coordinate programs or policy; and to another Federal agency, court, or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, *NSF-50*, "Principal Investigator/Proposal File and Associated Records," 69 Federal Register 26410 (May 12, 2004), and *NSF-51*, "Reviewer/Proposal File and Associated Records," 69 Federal Register 26410 (May 12, 2004). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

An agency may not conduct or sponsor, and a person is not required to respond to, an information collection unless it displays a valid Office of Management and Budget (OMB) control number. The OMB control number for this collection is 3145-0058. Public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding the burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to:

Suzanne H. Plimpton
Reports Clearance Officer
Division of Administrative Services
National Science Foundation
Arlington, VA 22230



Tel: (703) 292-5111, FIRS: (800) 877-8339 | TDD: (800) 281-8749

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